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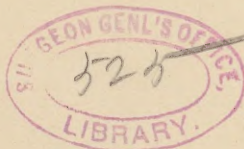
**SOME ADDITIONAL EXPERIENCES WITH
BEHRING'S DIPHTHERIA-ANTITOXIN
AND SOME REMARKS ON THE USE OF
LOEFFLER'S TOLUOL-SOLUTION.**

BY EDWIN J. KUH, M.D.,
OF CHICAGO, ILL.

In the *Journal of the American Medical Association* of December 1, 1894, I published the following brief report of a seemingly promising case of laryngeal diphtheria that terminated fatally, however, in spite of the reasonably prompt injection of the antitoxin:

Freda H., a robust girl, aged seven years, complained of hoarseness on November 6th, and remained indoors without symptoms of fever until November 11th. On that day she took to her bed, and Dr. F. W. Mercer saw her for the first time. On the same afternoon I saw her in consultation with Dr. Mercer. During the the day the temperature had ranged at slightly over 102°. The fauces *were entirely normal*, with the exception of a small, white, loose deposit on both tonsils, which was easily brushed away with cotton mounted on a probe. The child was hoarse, and the larynx somewhat stenotic. There was no retraction of the chest upon inspiration. Bronchitis existed in the larger tubes. Examination of the larynx was very unsatisfactory, because of an unusually depressed epiglottis and the child's intolerance of laryngoscopic examination.

The next morning, November 12th, the child coughed up a piece of membrane two inches in length, one-half an inch in width, and one millimeter in thickness. Laryngeal respiration was but slightly improved, and shortly after became very difficult. The temperature was about as before, but the pulse-rate became as high as



165. I saw her the same afternoon with Dr. Mercer, and injected ten cubic centimeters of Behring's antitoxin No. 2. A few hours afterward Dr. W. K. Jaques performed intubation. Cultures taken from the larynx showed the presence of Loeffler's bacilli.

On the morning of November 13th the temperature reached 104.5° , the pulse-rate was not lower, and the lungs were filled with fine crepitant râles.

This rapid inception of broncho-pneumonia led to a fatal issue at midnight of the same day. We could not observe that the injection of the antitoxin had made any impression whatsoever on the pulse or temperature of the child.

This unfortunate case must, however, not be considered as evidence against the efficacy of Behring's remedy, as the result was evidently clouded by the complication. The child did not die of diphtheria but of broncho-pneumonia.

Since then my experience with the remedy has been more favorable.

Eleanor B., aged five years, daughter of Dr. B., was visited December 10th by a cousin who had had diphtheria, but from whose throat the membrane had disappeared eighteen days previously, and cultures from whose throat had finally been pronounced free from Loeffler's bacilli. On December 16th the child, who was visiting relatives in the suburbs with her brother, aged eighteen months, became ill with diphtheria. She was brought to the city the following day, and was seen by me in consultation with Dr. W. S. Christopher. We found moderate swelling of the submaxillary lymph-glands, patches on both tonsils and on both sides of the posterior pharyngeal wall extending upward toward the post-nasal space. The systemic infection was slight, and the temperature-maximum did not exceed 102° . Cultures gave an almost pure growth of Loeffler's bacilli. I injected 600 antitoxin normal units on the 17th. The membranes began to exfoliate on the follow-

ing day, and disappeared entirely within forty-eight hours after the injection. Pulse and temperature became normal on the 18th. Ten days after the injection the child developed an extensive erythema. During the short course of the disease it was deemed expedient (with all due apologies to Prof. Behring) to treat the throat locally with Loeffler's toluol-solution.

Three days after my first visit Mrs. B., the child's mother, complained of excessive prostration and some tenderness in the throat. The right tonsil, concealed in the palatal folds, was found covered with false membrane, from which a fragment was easily removed. From this piece of membrane I received the most exquisite pure culture of Loeffler's bacilli I have ever grown from the throat. An application of Loeffler's solution was immediately thoroughly made to the surface of the diphtheric tonsil, and within a few hours the temperature declined from 99.5° to normal. On the following day the temperature rose to a maximum of 100.4° , and more membranous patches were seen farther to the left on the posterior pharyngeal wall. They were treated every three hours with applications of toluol, and the antitoxin was reserved for an aggravation of the disease, which, however, did not occur, as within forty-eight hours the patches disappeared entirely.

December 21st the younger child of Dr. B., aged eighteen months, developed a temperature of 101° . The child had been kept with the relatives (already mentioned) in the suburbs for purposes of isolation, but was now brought to the city because it was feared that he also was developing diphtheria. The appearance of the throat on the 21st certainly gave the most cogent reasons for that belief; for though no membrane had yet formed we were prepared to find it there the following morning. Unfortunately, no cultures could be obtained from the child's throat, because he had a knack of filling his mouth and throat with saliva in order to ward off

attempts at examination. He received a preventive injection of the antitoxin, after which on the following day all malaise, from which the child had been suffering on and off for a week, disappeared. In this connection it might be mentioned that in the family in which the children lived before being transferred to the city a child, aged fourteen years, developed diphtheria on December 24th, probably traceable to contact with Dr. B.'s children.

Ursula S., aged fourteen years, was seen December 19th through the courtesy of Dr. J. W. Dal. She, as well as the numerous other children of the family, had been suffering from hoarseness for about a week. Her condition on the 19th of December was such as we see in laryngeal diphtheria. Both tonsils were covered with patches which had not yet become confluent, and on each side of the pharyngeal wall a membranous deposit extended downward. The child was quite croupy, and the laryngeal affection such as to suggest the probable necessity of intubation within twenty-four hours. The culture-tube and the microscope confirmed the diagnosis of Loeffler's diphtheria. In this case there was a preponderance of other micro-organisms in the culture, among which a capsule-diplococcus was conspicuous. I injected 1000 antitoxin normal units and Dr. Dal kindly made regular applications of toluol to the tonsils and pharynx. The membrane loosened within the next twenty-four hours, and the constitutional symptoms, which had not been severe, promptly improved. Two days after the injection the patches had almost disappeared, although the hoarseness still persisted to some extent. Toluol was then gradually discontinued and a spray of corrosive sublimate substituted. On the afternoon of December 24th the child suddenly became worse, and on Christmas day there were again two deposits on the pharynx, with a return of the threatening laryngeal symptoms and considerable involvement of the submaxillary glands. I again injected the antitoxin

(10 cubic centimeters of Behring's No. 1 solution), with equally prompt response. The child continued to improve, and further recovery was uneventful with the exception of an urticaria-rash, which subsided in a couple of days.

Sydney R., aged thirteen years, spent a week in a house at Terre Haute, Indiana, in which diphtheria had occurred six months previously. He returned to Chicago December 31st, complaining of pain in the throat and general lassitude. I saw him the same night, and found a suspicious patch on the right tonsil, which I brushed thoroughly with Loeffler's toluol-alcohol-iron solution. The next morning the membranous deposit extended over most of the pharyngeal wall and to the left tonsil. The membrane on the right tonsil, to which toluol had been applied the previous night, had mostly disappeared. I injected nine cubic centimeters of Behring's antitoxin No. 1, and ordered the toluol-applications to be continued. Within the next twelve hours there was a continuous increase of the exudate, with extension slightly above the palatal arch; the temperature was 102.5° , the pulse 120, and there was intense somnolence. At that time the impression of the case was such as under ordinary circumstances would have offered a very grave prognosis. On the morning of January 2d, however, two-thirds of the membrane had come away; the temperature was elevated but slightly above normal, and the boy was bright and cheerful. On January 6th all traces of pseudo-membrane had disappeared. In this case the diagnosis of Loeffler's diphtheria was verified in the usual way. The boy's mother, who had been seriously exposed before I saw him, had a rise of temperature on January 2d, due to an inflamed throat, but, possibly owing to applications of toluol, did not contract the disease.

It seems to me rather important to mention that after the application of Loeffler's toluol-solution, scattered, filmy, and somewhat tenacious grayish deposits appear

in the throat, which are not diphtheric, but due to some chemic action of toluol on the secretions and epithelium of the throat. It is necessary to guard against the error of interpreting these chemic deposits as new invasions of the disease.

Toluol seems to me destined to become a very important auxiliary-treatment in conjunction with the antitoxin in the mixed infections of diphtheria. In the pseudo-diphtheria of scarlet fever it will probably be classed as a supreme local remedy. Unfortunately its pungent qualities will exclude it from application in nasal and pharyngeal invasion of the disease. The early diagnosis and treatment which the future will exact from every conscientious physician will naturally be a safeguard against infections beyond the reach of a combination of antitoxin and toluol.

There has until now been no local abortive treatment of acute follicular tonsillitis, the claims made for guaiacol to the contrary notwithstanding. Loeffler's toluol-solution has aborted all of the cases of acute follicular tonsillitis within my notice during the past weeks, two or three of these being particularly severe.

The introduction of this remedy will naturally lose in éclat by being overshadowed by the antitoxin. It is fortunate that we have become so suddenly doubly enriched; for after the smoke has cleared away we shall, I believe, realize that not every case of diphtheria should be treated with injections of the antitoxin, which are not so harmless as they were at first supposed to be. Each of the two remedies will find its sphere, and frequently they will be used in combination.

I am indebted to my brother, Dr. Sydney Kuh, for his kind assistance in establishing the microscopic diagnosis in these cases.

